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Atty. Ref. No. 030153

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Group Art Unit: 1711

Examiner: Ribar, Travis B.

In re application of:

JOCHEN VOSS

Serial No.: 09/757,810

Filed: January 10, 2001

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PRIMER FOR METALLIZING  
SUBSTRATE SURFACES

**APPLICANT'S BRIEF ON APPEAL**

Applicant, Jochen Voss, hereby submits this brief in support of his appeal of the decision of the Patent Office rejecting claims 1-9 in a Final Office Action dated August 6, 2002, and also in an Advisory Action dated November 20, 2002.

**Real Party in Interest**

The real party in interest is Atotech Deutschland GmbH, the assignee of Bayer Aktiengesellschaft, who is the assignee of Jochen Voss.

### **Related Appeals and Interferences**

There are no related appeals or interferences.

### **Status of Claims**

Claims 1-9 are pending and on appeal. Claims 1-9, as appealed, are reproduced in the Appendix.

### **Status of Amendments Filed Subsequent to Final Rejection**

A Response to the Final Rejection was filed on November 6, 2002. No claim amendments were made after the Final Rejection, and the Response submitted arguments only in support of the patentability of claims 1-9. In an Advisory Action dated November 20, 2002, the Examiner indicated that he had considered the Response but that it did not place the application in condition for allowance, and maintained the rejection of claims 1-9.

### **Summary of the Invention**

The claims on appeal relate to a primer for the metallization of a substrate surface. The claims teach a primer comprising a film or matrix former (Page 3, line 18 through Page 5, line 6); an additive (Page 5, lines 7-20); an ionic and/or colloidal metal (Page 5, line 21 through Page 6, line 2); a filler (Page 6, lines 3-8); a hydrophilic swelling material comprising silanol groups and/or modified silanol groups (Page 6, line 9 through Page 7, line 14); and organic solvents (Page 7, line 14). The invention allows improved adhesion of a metal coating by electroless chemical reduction, even at low bath loadings (Page 2, lines 20-31).

Independent claim 1 teaches a primer, independent claim 4 teaches a metallizable substrate comprising a primer and a substrate, and independent claim 5 teaches a metallized substrate comprising the reaction product of a primer and a substrate. Possible substrates for the various claims include, without limitation, plastic, glass, metallic substrates, and various polymers, copolymers, and polymer blends (Page 7, line 28 through Page 8, line 19).

### **Issues**

1. Whether the Examiner erred in rejecting claims 1-9 under 35 U.S.C. § 103 as being unpatentable over U. S. Patent No. 5,378,268 to Wolf et al. ("Wolf") in view of U.S. Patent No. 4,578,406 to Volz ("Volz") and U.S. Patent No. 5,985,785 to Lane et al. ("Lane").

### **Grouping of Claims**

Because the Examiner rejected claims 1-9 on the same grounds, all of the claims stand and fall together.

### **ARGUMENT**

#### **I. The Examiner erroneously rejected the claims of the application**

The Examiner rejected claims 1-9 under Section 103 as unpatentable over United States Patent No. 5,378,268 to Wolf in view of United States Patent No. 4,578,406 to Volz and United States Patent No. 5,985,785 to Lane. Wolf discloses a primer for the metallization of glass, metal, or plastic, wherein the primer comprises a film or matrix former, an additive having a molecular weight from 500 to 20,000, an ionic and/or colloidal noble metal, an organic and/or inorganic filler, and an organic solvent. There is no teaching or suggestion that the primer described in Wolf contains a swelling material.

Volz teaches a process for modifying the electrical conductivity of polyurethane foam by contacting the foam with a mixture of an additive that increases the conductivity of the foam and a substance that causes the foam to swell. The final step in the process claimed by Volz requires removal of the substance that causes the foam to swell, thereby reducing the volume of the foam and trapping the additive in the foam. Volz does not teach that the substance that causes the foam to swell remains in the foam, nor does Volz teach the use of a substance that swells in its own right.

Lane claims a method for manufacturing a laminate suitable for electroless deposition of copper. Neither the claims nor the examples of Lane mention inclusion of silanol groups. Lane does suggest the use of fumed silica as an anti-caking agent during the grinding of a catalytic metal salt prior to the salt's use in the laminate of the invention. While Lane suggests a preferred ratio of fumed silica to catalytic metal salt, it fails to indicate whether the fumed silica is even present in the final product.

In the first Office Action for the Application at issue mailed December 3, 2001, under the heading "Claim Rejections - 35 U.S.C. § 103," the Examiner rejected claims 1-9 of the Application. The Examiner first stated that Wolf discloses a primer with elements the same as those disclosed in the Application, "with the exception of a hydrophilic swelling agent to aid the transport of large molecules through the primer." The Examiner further acknowledged that in Wolf, "[t]he lack of a swelling agent is noted . . . though use of a swelling agent is not explicitly precluded."

The Examiner then discussed Volz. "One of ordinary skill in the art would know to add a swelling agent to the primer in order to facilitate the penetration of larger molecules through the primer. Volz shows a swelling agent used to aid the penetration of large molecules through a

matrix (column 2, lines 54-58)." In the second Office Action, mailed August 6, 2002, the Examiner clarified his position with regard to the use of Volz not as prior art to be used in combination with or to modify Wolf or Lane, but rather "to show that the addition of a swelling agent to a polymer composition is known to those in the polymer art to improve the penetration of large molecules into a polymer matrix and thereby provide additional motivation for the use of a swelling agent in Wolf."

The Examiner continued the reasoning in the First Office Action by stating that Lane "teaches that an anticaking agent may be included" in the catalytic metal-polymer complex claimed in that invention. Lane mentions that a fumed silica (with the trade name CAB-O-SIL<sup>®</sup>) may be used as an anticaking agent. The Examiner erroneously determined, "[T]he terms 'anticaking agent' (from Lane) and 'swelling agent' (from applicant's application) are synonymous." The Examiner concluded, "Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to take the primer claimed in Wolf and add a swelling agent to it as in Lane in order to increase the penetration of large molecular weight compounds, as seen in Volz and give improved adhesion."

The Examiner's conclusion is both technically and legally insufficient. As set forth below, the art cited by the Examiner is nonanalogous, does not teach all of the elements claimed in the invention, teaches away from the invention, and provides no motivation to combine references. Furthermore, nonobviousness of the Applicant's invention is demonstrated by unexpected, improved results.

**II. The art cited by the Examiner does not teach or suggest all of the claim limitations in the Application**

None of the art cited by the examiner in the instant case teaches or suggests the use in a primer of a hydrophilic swelling material comprising finely divided particles comprising silanol groups and related structures. For an invention to be obvious, all claimed limitations in the invention must be suggested or taught by the prior art. See *In re Royka*, 490 F.2d 981, 180 USPQ 580 (C.C.P.A. 1974). Wolf does not suggest that the primer it describes should contain any hydrophilic swelling material. Although Lane mentions silica, the silica used in Lane is not relevant to the use of silanol and related compounds in the disclosure of the Application.

Volz does not teach the inclusion and retention of a swelling material (i.e., a material that itself swells) in a film or matrix former. Instead, Volz teaches the use and subsequent removal of a swelling agent (i.e., a material that causes some other material to swell).

The distinction between the swelling material of the Application and the swelling agent of Volz is apparent when one considers their separate properties and examples. The Application describes hydrophilic swelling materials that have "a property of dissolving greatly and rapidly in aqueous solutions." (Page 6, lines 9-10). The Application also notes that "particular features of these swelling substances are extremely finely divided particles containing silanol groups." (Page 6, lines 25-26). Volz, on the other hand, states that "the swelling agent must swell the [polyurethane] foam . . . [and] should be easily removable from the foam after the swelling." (Column 2, lines 67-68; Column 3, lines 1-2). The preferred swelling agents of Volz are markedly different from the preferred swelling substance of the Application. The preferred

swelling agents of Volz "include methanol, methylene chloride and trichloroethylene." (Column 3, lines 19-21).

Because the references do not teach the use of a hydrophilic swelling substance comprising finely divided particles containing silanol groups and/or partly modified silanol groups, claims 1-9 of the Application are nonobvious and should be allowed.

**III. The art cited by the Examiner is nonanalogous to the invention of the Application**

The Examiner's finding that claims 1-9 of the Application are obvious is erroneous. The Examiner relied on Volz to demonstrate the knowledge of one skilled in the art, but Volz is nonanalogous art. Only analogous art may be relied upon by an Examiner in making an obviousness determination. *See In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *Id.*

Volz and the Application occupy different fields. Volz is concerned with "a modified polyurethane foam and a post-treatment process for producing the same" (Column 1, lines 9-11) and fails to address the problem with which the inventors of the Application were concerned. The Application, however, is directed to "an improved primer for metallizing substrate surfaces at low bath volume." (Page 1, lines 8-9).

Because Volz is nonanalogous art, it may not be relied upon in an obviousness analysis. The Examiner relied on Volz to demonstrate that "[o]ne of ordinary skill in the art would know to add a swelling agent to the primer in order to facilitate the penetration of larger molecules through a matrix." Even assuming that the remainder of the Examiner's reasoning were effective,

lack of the knowledge he claims to be shown by Volz is fatal to his reasoning. Claims 1-9 of the Application are nonobvious and should be allowed.

#### **IV. There is no motivation to combine the references cited by the Examiner**

For obviousness to be established through a combination of references, there must be some motivation in the prior art to combine the references. This motivation may come either from the references themselves or from knowledge that is generally available to one skilled in the art. Motivation to combine references may not come from the disclosure of the application; such hindsight is impermissible. *See In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

The references cited by the Examiner provide no motivation for their combination. Even assuming, *arguendo*, that another cited reference suggests the use of a swelling material in a primer, Wolf mentions neither inclusion of a swelling material in primer nor inclusion of any silanol-related group in a primer. In fact, Wolf disclaims the use of "a swelling adhesion treatment" in the context of the invention. "[I]t should be mentioned explicitly that, due to the use of primers according to the invention, a swelling adhesion treatment of the plastic is not necessary. As a result, the formation of stress cracks is avoided." (Column 4, lines 64-68).<sup>1</sup>

Volz also fails to provide any motivation for combination of Wolf and Lane. Volz teaches insertion of an additive into a foam through the use of an agent that causes swelling of the foam, followed by removal of the agent. The additive that is inserted during the practice of the Volz invention does not swell. As noted *supra*, Volz does not represent what one skilled in the primer art would know. Even if Volz did discuss insertion of a swelling material into the

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<sup>1</sup> Note that in the second Office Action the Examiner stated that Wolf's disfavor of swelling adhesion treatments was directed to swelling of the substrate rather than the primer. Though Wolf is unclear on this issue, even if the prohibition were directed to the substrate only, it would not constitute a suggestion to include a swelling material in the primer as the term is used in the Application.



foam of the invention, there is no mention in Volz of the use of the invention in a primer for electroless deposition.

Lane provides no motivation for combination with Wolf. Although Lane mentions that fumed silica may be used as an anticaking agent during dry grinding of a component, Lane contains no suggestion that the fumed silica would have any function in or contribute at all to the properties of the composition described in Lane. There is not even an indication that the fumed silica would remain in the final composition if fumed silica were even chosen as an anticaking agent during the practice of Lane.

Significantly, Lane discusses creation of a laminate, not a primer, and there is no indication in Lane that its teachings would be applicable to the primer arts. Even assuming, for the sake of argument, that the mention of fumed silica in Lane is at all significant, it is only to show that it may be used to aid in the initial mixture of components, not to provide the novel benefits to be gained from its use in Applicant's invention. There is nothing in Lane that might show the desirability of using a hydrophilic swelling material in a primer designed to improve the adhesion of a metal coating during electroless deposition.

None of the cited art gives any motivation to combine Wolf and Lane. Even assuming, *arguendo*, that a combination of those references would make obvious the claims of the Application, combining the cited references would require exercise of hindsight based on the disclosure of the application. That is not permitted. It is wrong to use applicant's disclosure "as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the results of [applicants'] claims. . . . Monday morning quarterbacking is quite improper when resolving the question of nonobviousness..." See *Orthopedic Equip. Co., Inc. v.*

*United States*, 702 F.2d 1005, 1012, 217 USPQ 193, 199 (Fed. Cir. 1983). Claims 1-9 of the Application are nonobvious and should be allowed.

**V. The references cited by the Examiner teach away from the claimed invention**

When an examiner attempts to establish obviousness, it is important that he consider portions of the reference that lead away from a claimed invention. *See W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983). The Examiner in this case failed to recognize that Volz teaches away from the claimed invention.

Volz suggests that representative swelling agents include carbon tetrachloride, cyclohexane, and xylene, among others. Carbon tetrachloride, cyclohexane, and xylene are insoluble in water; they are hydrophobic. The swelling materials of the Application are hydrophilic. Therefore, Volz teaches away from the invention of the Application. Volz is ineffective to aid in establishing any argument that the invention of the Application is obvious.

**VI. Superior results achieved by the invention of the Application demonstrate its nonobviousness**

Even if the Examiner were able to demonstrate *prima facie* obviousness, the showing would be rebutted by the obvious advantageous properties that the primer taught by the Application demonstrates over any prior primer art. *See Ex parte A*, 17 USPQ2d 1716 (Bd. Pat. App. & Inter. 1990) (holding unexpected superior therapeutic activity of compound sufficient to rebut *prima facie* obviousness). As shown on Page 4 of the Application, the primer taught by the Application provides for greatly improved adhesion of a metal coating even at low bath loadings. Note that Example 2, which lacks only the hydrophilic swelling material of the invention, resulted in a score of 0 B in the cross-cut test (no adhesion), while the remaining examples, all of

which contained a hydrophilic swelling material, resulted in a score of 5 B (outstanding adhesion).<sup>2</sup> These superior results conclusively demonstrate that claims 1-9 are nonobvious.

**CONCLUSION**

For the foregoing reasons, the claims on appeal are patentable over the references cited by the Examiner. Accordingly, reversal of the Final Rejection, and allowance of appealed claims 1-9 are respectfully requested.

Respectfully submitted,



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<sup>2</sup> As noted on Page 2, lines 8-13 of the Application, the cross-cut test is a test conducted to measure firmly adhering metallization following electroless metallization of the primer, in accordance with ASTM D 33-59-95a or DIN 53 151.

**APPENDIX**

1. A primer comprising:
  - (a) from about 3 to about 40% by weight of a film or matrix former,
  - (b) from about 0.1 to about 15% by weight of an additive having a molecular mass that ranges from about 500 to about 20,000,
  - (c) from about 0.1 to about 15% by weight of an ionic and/or colloidal metal or its organometallic covalent compound or its complex compound with organic ligands,
  - (d) from about 0.5 to about 30% by weight of an organic and/or inorganic filler,
  - (e) from about 0.05 to about 5% by weight of a hydrophilic swelling material comprising finely divided particles containing silanol groups and/or partly modified silanol groups having a diameter that ranges from about 7 to about 40 nm and a specific surface area that ranges from about 50 to about 380 m<sup>2</sup>/g, and
  - (f) from about 50 to about 90% by weight of organic solvents, wherein all amounts by weight being based on the overall primer formulation.
2. The primer of Claim 1, wherein the film or matrix former comprises polyurethane.
3. The primer of Claim 1, wherein the finely divided particles of the hydrophilic swelling substance have a spherical surface.
4. A metallizable substrate comprising:
  - (a) a substrate,
  - (b) a primer comprising:
    - (i) from about 3 to about 40% by weight of a film or matrix former,

(ii) from about 0.1 to about 15% by weight of an additive having a molecular mass that ranges from about 500 to about 20,000,

(iii) from about 0.1 to about 15% by weight of an ionic and/or colloidal metal or its organometallic covalent compound or its complex compound with organic ligands,

(iv) from about 0.5 to about 30% by weight of an organic and/or inorganic filler,

(v) from about 0.05 to about 5% by weight of a hydrophilic swelling material comprising finely divided particles containing silanol groups and/or partly modified silanol groups having a diameter of from 7 to 40 nm and a specific surface area of 50 to 380 m<sup>2</sup>/g, and

(vi) from about 50 to 90% by weight of organic solvents, wherein all amounts by weight being based on the overall primer formulation.

5. A metallized substrate comprising the reaction product of:

(a) a substrate,

(b) a primer comprising:

(i) from about 3 to 40% by weight of a film or matrix former,

(ii) from about 0.1 to about 15% by weight of an additive having a molecular mass that ranges from about 500 to about 20,000,

(iii) from about 0.1 to about 15% by weight of an ionic and/or colloidal metal or its organometallic covalent compound or its complex compound with organic ligands,

(iv) from about 0.5 to about 30% by weight of an organic and/or inorganic filler,

(v) from about 0.05 to about 5% by weight of a hydrophilic swelling material comprising finely divided particles containing silanol groups and/or partly modified silanol groups having a diameter of from 7 to 40 nm and a specific surface area 50 to 380 m<sup>2</sup>/g, and

(vi) from about 50 to about 90% by weight of organic solvents, wherein all amounts by weight being based on the overall primer formulation.

6. The metallized substrate of Claim 5, wherein the substrate comprises a plastic substrate.

7. The metallized substrate of Claim 5, wherein the substrate comprises a glass substrate.

8. The metallized substrate of Claim 5, wherein the substrate comprises a metallic substrate.

9. The metallized substrate of Claim 5, wherein the substrate is selected from the group consisting of acrylonitrile-butadiene-styrene polymers, polycarbonates, polyamides, polyesters, polyvinyl chloride, polyethylene, polypropylene, polyphenylene sulphide, polyphenylene oxide, polyurethanes, polyimides, polyamideimides, polyetherimide, polysulphones, polyacetals, polystyrenes, thermosets, blends of the aforementioned polymers, and copolymers of the aforementioned polymers.